I claim:

1. An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons;

an acceleration electrode for accelerating the primary electrons; and

a secondary electrode for producing secondary electrons when the accelerated primary electrons arrive.

2. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening;

said aperture opening extends obliquely through said secondary electrode and/or said aperture opening prevents primary electrons from passing through.

3. The apparatus according to claim 2, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

4. The apparatus according to claim 2, wherein:

said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

5. The apparatus according to claim 2, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

6. The apparatus according to claim 2, wherein said aperture opening is formed by laminates.

7. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening having an aperture direction configured at an angle of a magnitude of between 30° and 70° with respect to a normal of said secondary electrode near said aperture opening.

8. The apparatus according to claim 7, wherein:

said angle has a magnitude of 55° with respect to the normal of said secondary electrode near said aperture opening.

9. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening having an aperture direction configured at an angle defined by: tan (90° -w) = d/b; and

w is said angle, d is a thickness of said secondary electrode, and b is a width of said aperture opening.

10. The apparatus according to claim 1, wherein:

said secondary electrode has side walls defining an aperture opening;

said side walls are spaced a distance apart; and

said distance between said side walls is between 2 mm and 6 mm.

11. The apparatus according to claim 10, wherein said distance between said side walls is 4 mm.

12. The apparatus according to claim 1, wherein:

said at least one primary electrode includes only one primary electrode.

13. The apparatus according to claim 1, further comprising:

a plurality of primary electrodes;

said secondary electrode formed with a plurality of aperture openings;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

14. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening;

said secondary electrode is made of aluminum or of an aluminum alloy.

15. The apparatus according to claim 1, wherein:

said secondary electrode is made of Al 99 or of an even purer aluminum.

16. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening; and

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

17. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening; and

said secondary electrode is made of aluminum oxide.

18. The apparatus according to claim 1, wherein:

said secondary electrode is formed with at least one aperture opening; and

said secondary electrode has a mean surface roughness of between 5 and 8 μm.

19. The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings.

20. The apparatus according to claim 1, wherein:

said acceleration electrode is formed at least 500 openings.

21. The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 1000 openings.

22. The apparatus according to claim 19, wherein:

said acceleration electrode includes a wire mesh having at least 100 holes or meshes.

23. The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of aluminum or an aluminum alloy.

24. The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of Al 99.9 or an even purer aluminum.

25. The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said secondary electrode has a mean surface roughness; and

said acceleration electrode has a mean surface roughness of less than said mean surface roughness of said secondary electrode.

26. The apparatus according to claim 25, wherein:

said mean surface roughness of said acceleration electrode is between 2.5 and 6 μm.

27. The apparatus according to claim 1, further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

28. The apparatus according to claim 27, wherein said workpiece is a semiconductor substrate.

29. The apparatus according to claim 1, further comprising:

a free space used for holding a material or workpiece to be processed.

30. The apparatus according to claim 1, further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation direction of said ion beam.

31. The apparatus according to claim 1, further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to a propagation direction of said ion beam.

32. An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons; and

a secondary electrode for accelerating the primary electrons;

said secondary electrode formed with at least one aperture opening for preventing primary electrons from passing through.

33. The apparatus according to claim 32, wherein:

said aperture opening extends obliquely through said secondary electrode.

34. The apparatus according to claim 33, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

35. The apparatus according to claim 33, wherein:

said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

36. The apparatus according to claim 33, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

37. The apparatus according to claim 33, wherein said aperture opening is formed by laminates.

38. The apparatus according to claim 32, wherein:

said aperture opening has an aperture direction configured at an angle of a magnitude of between 30° and 70° with respect to a normal of said secondary electrode near said aperture opening.

39. The apparatus according to claim 38, wherein:

said angle has a magnitude of 55° with respect to the normal of said secondary electrode near said aperture opening.

40. The apparatus according to claim 32, wherein:

said opening has an aperture direction configured at an angle defined by: $\tan (90° - w) = d/b$; and

w is said angle, d is a thickness of said secondary electrode, and b is a width of said aperture opening.

41. The apparatus according to claim 32, wherein:

said secondary electrode has side walls defining said aperture opening;

said side walls are spaced a distance apart; and

said distance between said side walls is between 2 mm and 6 mm.

42. The apparatus according to claim 32, wherein said distance between said side walls is 4 mm.

43. The apparatus according to claim 32, wherein:

said at least one primary electrode includes only one primary electrode.

44. The apparatus according to claim 32, further comprising:

a plurality of primary electrodes;

said secondary electrode formed with a plurality of aperture openings;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

45. The apparatus according to claim 32, wherein:

said secondary electrode is made of aluminum or of an aluminum alloy.

46. The apparatus according to claim 32, wherein:

said secondary electrode is made of Al 99 or of an even purer aluminum.

47. The apparatus according to claim 32, wherein:

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

48. The apparatus according to claim 32, wherein:

said secondary electrode is made of aluminum oxide.

49. The apparatus according to claim 32, wherein:

said secondary electrode has a mean surface roughness of between 5 and 8 μm.

50. The apparatus according to claim 32, further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

51. The apparatus according to claim 50, wherein said workpiece is a semiconductor substrate.

52. The apparatus according to claim 32, further comprising:

a free space used for holding a material or workpiece to be processed.

53. The apparatus according to claim 32, further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation direction of said ion beam.

54. The apparatus according to claim 32, further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to a propagation direction of said ion beam.

55. A secondary electrode configuration, comprising:

a secondary electrode for producing secondary electrons;

said secondary electrode formed with at least one aperture opening extending obliquely through said secondary electrode.

56. An acceleration electrode configuration, comprising:

a acceleration electrode is formed with at least 100 openings.

57. The apparatus according to claim 56, wherein:

said acceleration electrode is formed at least 500 openings.

58. The apparatus according to claim 56, wherein:

said acceleration electrode is formed with at least 1000 openings.

59. The apparatus according to claim 56, wherein:

said acceleration electrode includes a wire mesh forming said openings.

60. The apparatus according to claim 56, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of aluminum or an aluminum alloy.

61. The apparatus according to claim 56, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of Al 99.9 or an even purer aluminum.

62. The apparatus according to claim 56, wherein:

said acceleration electrode has a mean surface roughness of between 2.5 and 6 μm.